

## Claims

What is claimed is:

- 5           1. A compound as shown in Figure 1, wherein:  
a base unit consists of tris (8-quinolino)aluminum(III) (Alq3);  
said base unit in the 3- or 4-position is substituted with an electron-donor group;  
and  
said base unit in the 5-position is simultaneously substituted with an  
10 electron-acceptor or p-delocalizing group.
2. The compound according to Claim 1, wherein said electron-donor group in  
said 3- or 4-position is selected from a group consisting of -CR'R''', NR2, and -OR,  
wherein R, R', R'' = H or Alkyl, and R''' = Alkyl.
- 15           3. The compound according to Claim 1, wherein said electron-acceptor or  
p-delocalizing groups in said 5-position are selected from a group consisting of -CX3,  
-CX2, -CX3, -SO3R, -CR=CR2, -CX=CX2, -COOR, -SO3R, -SO3M and -COOM,  
whereby X=F, Cl, Br; R = H or Akyl, and M = metal ion.

4. The compound according to Claim 2, wherein said electron-acceptor or p-delocalizing groups in said 5-position are selected from a group consisting of -CX<sub>3</sub>, -CX<sub>2</sub>, -CX<sub>3</sub>, -SO<sub>3</sub>R, -CR=CR<sub>2</sub>, -CX=CX<sub>2</sub>, -COOR, -SO<sub>3</sub>R, -SO<sub>3</sub>M and -COOM, 5 whereby X=F, Cl, Br; R = H or Akyl, and M = metal ion.

5. The compound according to Claim 1, wherein said electron-donor group in the said 3- or 4-position is -CH<sub>3</sub> and said electron-acceptor group in said 5-position is -CF<sub>3</sub>.

6. The compound according to Claim 1, wherein said electron-donor group in the said 3- or 4-position is -OR and said electron-acceptor group in said 5-position is -CF=CF<sub>2</sub>.

7. The compound according to Claim 1, wherein said electron-donor group in the said 3- or 4-position is -CH<sub>3</sub> and said electron-acceptor group in said 5-position is -CF=CF<sub>2</sub>.

8. A organic material having tris (8-quinolinato)aluminum(III) (Alq<sub>3</sub>) as a base unit and wherein:

Sub  
Ct  
Cont

said base unit in the 3- or 4-position is substituted with an electron-donor group;  
and  
said base unit in the 5-position is simultaneously substituted with an  
electron-acceptor or p-delocalizing group.

5

9. The material according to Claim 8, wherein said electron-donor group in said  
3- or 4-position is selected from a group consisting of  $-CR'R''R'''$ ,  $NR_2$ , and  $-OR$ , wherein  
 $R, R', R'' = H$  or Alkyl, and  $R''' = Alkyl$ .

10

10. The compound according to Claim 8, wherein said electron-acceptor or  
p-delocalizing groups in the said 5-position are selected from a group consisting of  $-CX_3$ ,  
 $-CX_2$ ,  $-CX_3$ ,  $-SO_3R$ ,  $-CR=CR_2$ ,  $-CX=CX_2$ ,  $-COOR$ ,  $-SO_3R$ ,  $-SO_3M$  and  $-COOM$ ,  
whereby  $X=F, Cl, Br$ ;  $R = H$  or Akyl, and  $M = metal\ ion$ .

15

11. The material according to Claim 9, wherein said electron-acceptor or  
p-delocalizing groups in said 5-position are selected from a group consisting of  $-CX_3$ ,  
 $-CX_2$ ,  $-CX_3$ ,  $-SO_3R$ ,  $-CR=CR_2$ ,  $-CX=CX_2$ ,  $-COOR$ ,  $-SO_3R$ ,  $-SO_3M$  and  $-COOM$ ,  
whereby  $X=F, Cl, Br$ ;  $R = H$  or Akyl, and  $M = metal\ ion$ .

12. The material according to Claim 8, wherein said electron-donor group in the said 3- or 4-position is -CH<sub>3</sub> and said electron-acceptor group in the said 5-position is -CF<sub>3</sub>.

5 13. The material according to Claim 8, wherein said electron-donor group in said 3- or 4-position is -OR and said electron-acceptor group in said 5-position is -CF=CF<sub>2</sub>.

14. The material according to Claim 8, wherein said electron-donor group in the said 3- or 4-position is -CH<sub>3</sub> and said electron-acceptor group in said 5-position is  
10 -CF=CF<sub>2</sub>.

15. An electroluminescent device comprising:  
an anode,  
an organic hole injecting and transporting zone,  
15 an organic electron injecting and transporting zone;  
a cathode; and  
a luminescent layer of the compound shown in Figure 1, wherein said compound  
is substituted in the 3- or 4-position with an electron-donor group and simultaneously  
substituted in said 5-position with an electron-acceptor or a p-delocalizing group.

16. An electroluminescent device according to Claim 15, wherein said electron-donor group in the 3-or 4-positions is selected from the group consisting of -CR'R''R''', NR<sub>2</sub>, and -OR, wherein R, R', R''=H or Alkyl and R'''=Alkyl.

5

17. An electroluminescent device according to Claim 15, wherein said electron-donor or p-delocalizing groups in the 5-position are selected from the group consisting of -CX<sub>3</sub>, -CX<sub>2</sub>, -CX<sub>3</sub>, -SO<sub>3</sub>R, -CR=CR<sub>2</sub>, -CX=CX<sub>2</sub>, -COOR, -SO<sub>3</sub>M, and -COOM, whereby X = F, Cl, Br; R = H or Alkyl and M = metal ion.

10

18. An electroluminescent device according to Claim 16, wherein said electron-donor or p-delocalizing groups in the 5-position are selected from the group consisting of -CX<sub>3</sub>, -CX<sub>2</sub>, -CX<sub>3</sub>, -SO<sub>3</sub>R, -CR=CR<sub>2</sub>, -CX=CX<sub>2</sub>, -COOR, -SO<sub>3</sub>M, and -COOM, wherein X = F, Cl, Br; R = H or Alkyl and M = metal ion.

15

19. An electroluminescent device comprising:  
an anode,  
an organic hole injecting and transporting zone,  
an organic electron injecting and transporting zone;

a cathode; and

a luminescent layer of tris(8-quinolinolato)aluminum(III) (Alq3), wherein said Alq3 is substituted in the 3- or 4-position with an electron-donor group and simultaneously substituted in said 5-position with an electron-acceptor or a p-delocalizing group.

20. An electroluminescent device according to Claim 19, wherein said electron-donor group in said 3-or 4-position is selected from the group consisting of -CR'R''R''', NR2, and -OR, wherein R, R', R'' = H or Alkyl and R''' = Alkyl.

21. An electroluminescent device according to Claim 19, wherein said electron-donor or p-delocalizing groups in said 5-position are selected from the group consisting of -CX3, -CX2,-CX3, -SO3R, -CR=CR2, -CX=CX2, -COOR, -SO3M, and -COOM, whereby X = F, Cl, Br; R = H or Alkyl and M = metal ion.

22. An electroluminescent device according to Claim 20, wherein said electron-donor or p-delocalizing groups in said 5-position are selected from the group consisting of  $-CX_3$ ,  $-CX_2$ ,  $-CX$ ,  $-SO_3R$ ,  $-CR=CR_2$ ,  $-CX=CX_2$ ,  $-COOR$ ,  $-SO_3M$ , and  $-COOM$ , whereby  $X = F, Cl, Br$ ;  $R = H$  or Alkyl and  $M =$  metal ion.

5